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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,438	12/23/2003	Yoshihiro Takao	032180	8136
38834	7590	02/10/2005		
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			EXAMINER QUACH, TUAN N	
			ART UNIT 2826	PAPER NUMBER

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/743,438	Applicant(s) TAKAO, YOSHIHIRO	
	Examiner Tuan Quach	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 9-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                                                                |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                           | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/14/2004</u> . | 6) <input type="checkbox"/> Other: _____                                                |

### DETAILED ACTION

Claims 9-16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on January 21, 2005.

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bease et al. (Bease) taken with Tsukamoto and Wu.

Regarding claims 1-3, Bease (6,239,025) teaches a semiconductor device comprising a first insulating layer 12, on semiconductor substrate 4, an interconnection 46 buried in at least a surface side of the first insulating and having a main interconnection portion, a second insulating film 16 formed on the first insulating film and having a contact 18 in contact hole down to the end part of the main interconnection portion of the interconnection. The extension in both directions, e.g., for claim 3, is also shown. See Fig. 4H, column 7 line 10-37. Regarding claims 6 and 7, the first interconnection corresponds to layer 9, the first insulating layer 12 over the interconnect 9 and substrate 4, second interconnect 46 buried in layer 12 having main interconnection intersecting the first direction and bridging the first interconnection. Bease lacks anticipation primarily in that the extended portion at the end of the main interconnection portion extending perpendicularly to an extending direction of the main interconnection portion is not explicitly recited.

Tsukamoto (6,040,224) teaches an interconnection pattern employing extended portion 2 at the end of the main interconnection portion 1 extending perpendicularly to an extending direction of the main interconnection portion 1. See the abstract, Figs. 3, 4, column 3 line 47 to column 4 line 3, column 5 line 35-39. The advantages include the prevention of deformation of the interconnect pattern and increased integration.

Wu (6,017,815) documents the conventional method of patterning metal line 12 including extending portion perpendicular to the metal line which serves as a via border to help avoid misalignment during patterning of an overlying insulating layer to the interconnection. See column 1 lines 19-39.

It would have been obvious to one skilled in the art in practicing the above invention to have employed the interconnection pattern to have the extended portion perpendicular at the end of the main interconnection as delineated since such is advantageous as taught by Tsukamoto to prevent deformation and to attain increased integration and as taught by Wu wherein such extending portion would serve as border to prevent via or opening in an upper insulating layer to the interconnection from being formed beyond the edge of the interconnection. The selection of the extending direction in the first direction as in claim 6 would correspond to intersecting interconnection levels including at right angle, e.g., as in instant Fig. 1C and as such would have been conventional and obvious.

Regarding claim 4, the selection of the appropriate width of the extending portion including the width to be below a width of the main interconnect portion would have obvious and apparent within the purview of one skilled in the art given the teachings of Tsukamoto, column 3 lines 50-53.

Regarding claim 5, the optimization of the width of the via or contact hole would have been obvious and would have been a matter of routine optimization to obtain the maximum contact area given the extended portion is provided and as evidenced in Fig. 2 of Wu.

Regarding claim 8, the second interconnection not connected to the first interconnection would have been obvious where other interconnection layer parallel to layer or separated therefrom, e.g., an adjacent but unconnected interconnect on the same level, where connection is not required or desired, e.g., structure 8 in Bease if

Art Unit: 2814

unconnected to structure 9, or two adjacent unconnected interconnects on the same level, e.g., instant Fig. 1C.


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wald et al. 6,407,455 is made of record.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Quach whose telephone number is (571) 272-1717. The examiner can normally be reached on M - F from 8:30 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1562.

  
**Tuan Quach**  
**Primary Examiner**